

(11) EP 1 122 344 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3: 30.01.2002 Bulletin 2002/05

(51) Int Cl.7: **D01F 9/127**, H01J 31/12, H01M 4/58, H01J 1/304

(43) Date of publication A2: 08.08.2001 Bulletin 2001/32

(21) Application number: 01102417.1

(22) Date of filing: 02.02.2001

(84) Designated Contracting States:

AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU

MC NL PT SE TR

Designated Extension States:

AL LT LV MK RO SI

(30) Priority: 04.02.2000 JP 2000028001 04.02.2000 JP 2000028003 12.01.2001 JP 2001004550

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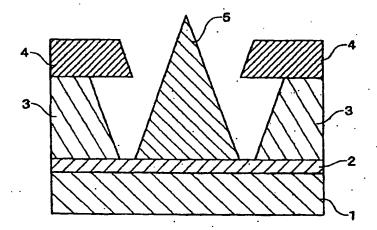
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(54) Graphite nanofibers and their use

(57) A graphite nanofiber material herein provided has a cylindrical structure in which graphene sheets each having an ice-cream cone-like shape whose tip is cut off are put in layers through catalytic metal particles; or a structure in which small pieces of graphene sheets having a shape adapted for the facial shape of a catalytic metal particle are put on top of each other through the

catalytic metal particles. The catalytic metal comprises Fe, Co or an alloy including at least one of these metals. The material can be used for producing an electron-emitting source, a display element, which is designed in such a manner that only a desired portion of a luminous body emits light, a negative electrode carbonaceous material for batteries and a lithium ion secondary battery.

FIG.1





EUROPEAN SEARCH REPORT

Application Number

EP 01 10 2417

Category	Citation of document with ir of relevant pass	dication, where appropriate, ages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (INLCL7)
P,X	DATABASE WPI Section Ch, Week 20 Derwent Publication Class E36, AN 2001- XP002184219 & JP 2001 019413 A 23 January 2001 (20	s Ltd., London, GB; 052537 (EBARA CORP),	1-3	D01F9/127 H01J31/12 H01M4/58 H01J1/304
Υ	* abstract *		4-10	
E	PATENT ABSTRACTS OF vol. 2000, no. 22, 9 March 2001 (2001- & JP 2001 146643 A 29 May 2001 (2001-0 * abstract *	03-09) (EBARA CORP),	1-3	
P,Y	EP 1 047 097 A (MAT LTD) 25 October 200 * the whole documen & WO 99 66523 A (23 23 December 1999 (1	t * -12-99)	0 4-8	TECHNICAL FIELDS SEARCHED (Int.CL.7)
Y	11thium-ion recharg CARBON, XX, XX, vol. 37, no. 2, Feb pages 165-180, XPOO ISSN: 0008-6223 * the whole documen	ruary 1999 (1999-02), 4158110 t *	9,10	DO1F HO1J
	The present search report has	•		
	Place of search THE HAGUE	Outs of completion of the search 28 November 200	1 121	Examiner rrida Torrell, J
X: par Y: par doc A: ted O: not	CATEGORY OF CITED DOCUMENTS ticularly relevant if taken alone ticularly relevant if combined with another ticularly relevant if combined with another to the same category hnological background n-written disclosure kmediate document	T : theory or princ E : earlier patent o siter the filing ther D : document clie L : document clie	iple underlying the socument, but pub	e Invention dished on, or n s

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 01 10 2417

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way tiable for these particulars which are merely given for the purpose of information.

P 2001146643 A 29-05-2001 NONE P 1047097 A 25-10-2000 EP 1047097 A1 25-10-2000 WO 9966523 A1 23-12-1999 JP 2000090813 A 31-03-2000	Patent document cited in search report	Publication date			Patent family member(s)	
EP 1047097 A 25-10-2000 EP 1047097 A1 25-10-2000 W0 9966523 A1 23-12-1999 JP 2000090813 A 31-03-2000	P 2001019413 A	23-01-2001	JP	3100962	B2	23-10-2000
WO 9966523 A1 23-12-1999 JP 2000090813 A 31-03-2000	P 2001146643 A	29-05-2001	NONE			
	P 1047097 A	25-10-2000	WO JP	9966523 2000090813	A1 A	25-10-2000 23-12-1999 31-03-2000 01-05-2001

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82